



Micro Commercial Components  
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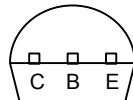
# MPSA13 MPSA14

## NPN Silicon Darlington Transistor

### Features

- Capable of 1.5Watts of Power Dissipation.
- Collector-current 500mA
- Collector-base Voltage 30V
- Operating and storage junction temperature range: -55°C to +150°C

Pin Configuration  
Bottom View



### Maximum Ratings

Symbol	Rating	Rating	Unit
V <sub>CES</sub>	Collector-Emitter Voltage	30	V
V <sub>CBO</sub>	Collector-Base Voltage	30	V
V <sub>EBO</sub>	Emitter-Base Voltage	10	V
I <sub>C</sub>	Collector Current Continuous	500	mA
P <sub>D</sub>	Total Device Dissipation @ T <sub>A</sub> =25°C	625	mW
	Derate above 25°C	5.0	mW/°C
P <sub>D</sub>	Total Device Dissipation @ T <sub>A</sub> =25°C	1.5	W
	Derate above 25°C	12	mW/°C
T <sub>J</sub>	Junction Temperature	-55 to +150	°C
T <sub>STG</sub>	Storage Temperature	-55 to +150	°C

### Electrical Characteristics @ 25°C Unless Otherwise Specified

Symbol	Parameter	Min	Max	Units
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#### OFF CHARACTERISTICS

V <sub>(BR)CES</sub>	Collector-Emitter Breakdown Voltage (I <sub>C</sub> =100uAdc, I <sub>B</sub> =0)	30		Vdc
I <sub>CBO</sub>	Collector Cutoff Current (V <sub>CB</sub> =30Vdc, I <sub>E</sub> =0)		100	nAdc
I <sub>EBO</sub>	Emitter Cutoff Current (V <sub>EB</sub> =10Vdc, I <sub>C</sub> =0)		100	nAdc

#### ON CHARACTERISTICS<sup>(1)</sup>

h <sub>FE(1)</sub>	DC Current Gain (I <sub>C</sub> =10mAdc, V <sub>CE</sub> =5.0Vdc)	MPSA13 MPSA14	5000 10000		
h <sub>FE(2)</sub>	DC Current Gain (I <sub>C</sub> =100mAdc, V <sub>CE</sub> =5.0Vdc)	MPSA13 MPSA14	10000 20000		
V <sub>CE(sat)</sub>	Collector-Emitter Saturation Voltage (I <sub>C</sub> =100mAdc, I <sub>B</sub> =0.1mAdc)			1.5	Vdc
V <sub>BE(on)</sub>	Base-Emitter Saturation Voltage (I <sub>C</sub> =100mAdc, V <sub>CE</sub> =5.0Vdc)			2.0	Vdc

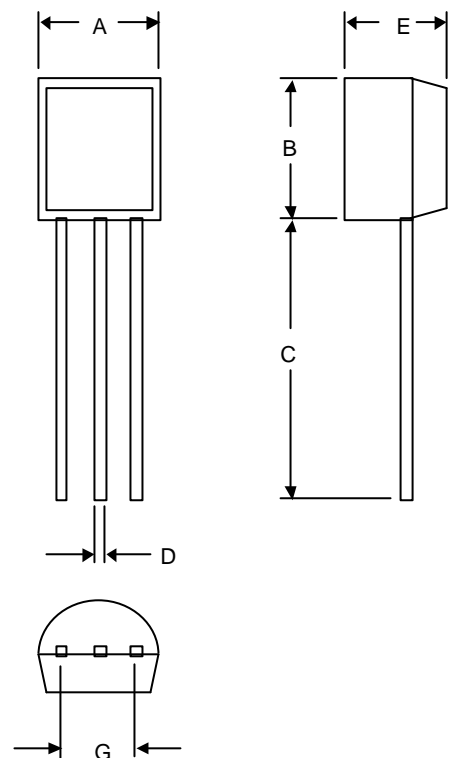
#### SMALL-SIGNAL CHARACTERISTICS

f <sub>T</sub>	Current-Gain – Bandwidth Product <sup>(2)</sup> (I <sub>C</sub> =10mAdc, V <sub>CE</sub> =5.0Vdc, f=100MHz)	125			MHz
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1. Pulse Test: Pulse Width<300us, Duty Cycle<2.0%

2. f<sub>T</sub>=|h<sub>fe</sub>| x f<sub>test</sub>

### TO-92



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	.175	.185	4.45	4.70	
B	.175	.185	4.46	4.70	
C	.500	---	12.7	---	
D	.016	.020	0.41	0.63	
E	.135	.145	3.43	3.68	
G	.095	.105	2.42	2.67	

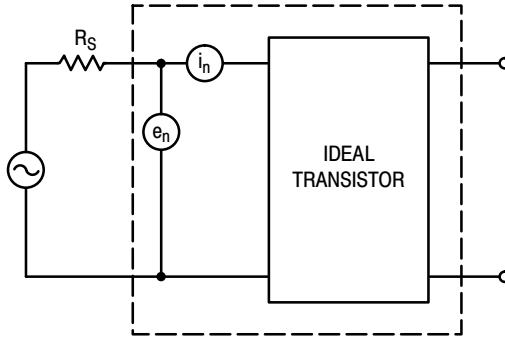


Figure 1. Transistor Noise Model

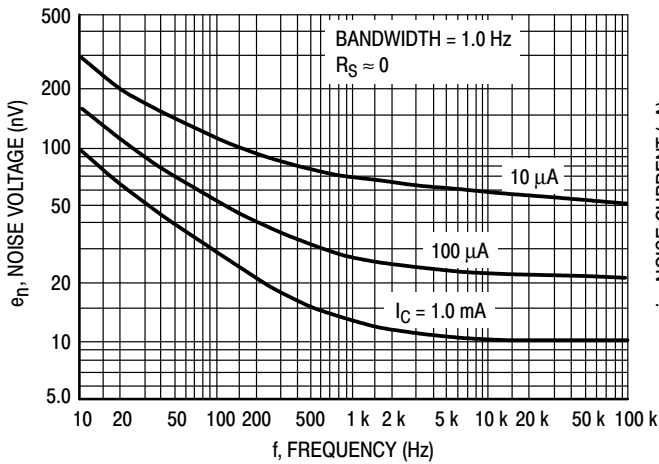


Figure 2. Noise Voltage

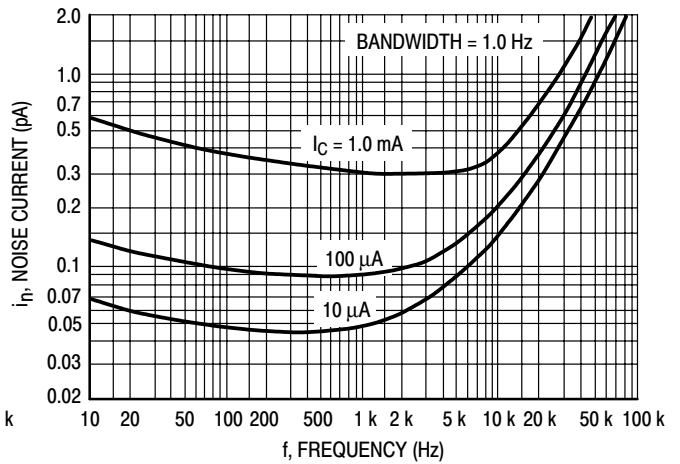


Figure 3. Noise Current

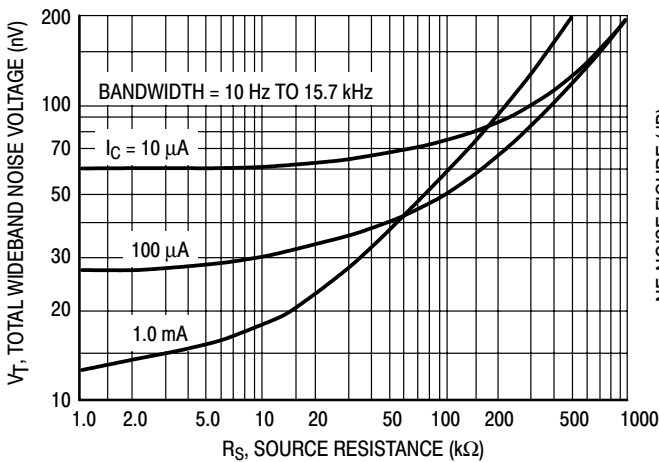


Figure 4. Total Wideband Noise Voltage

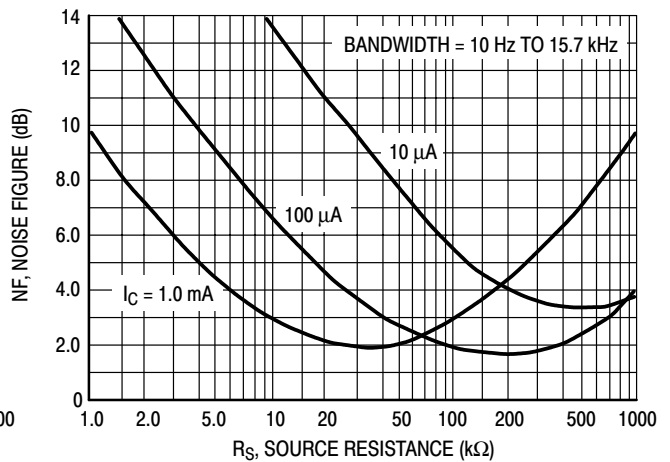


Figure 5. Wideband Noise Figure

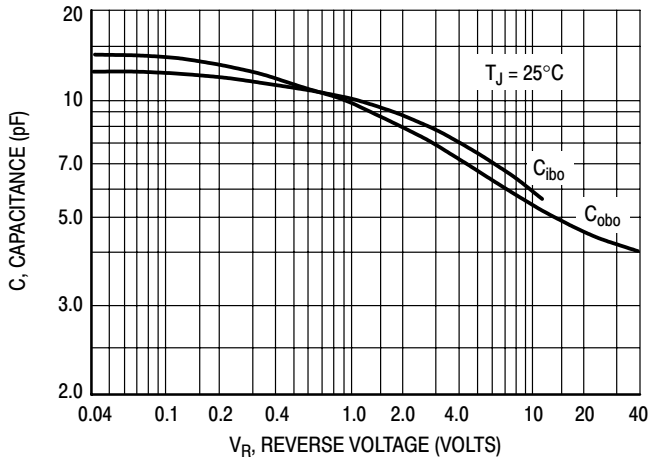


Figure 6. Capacitance

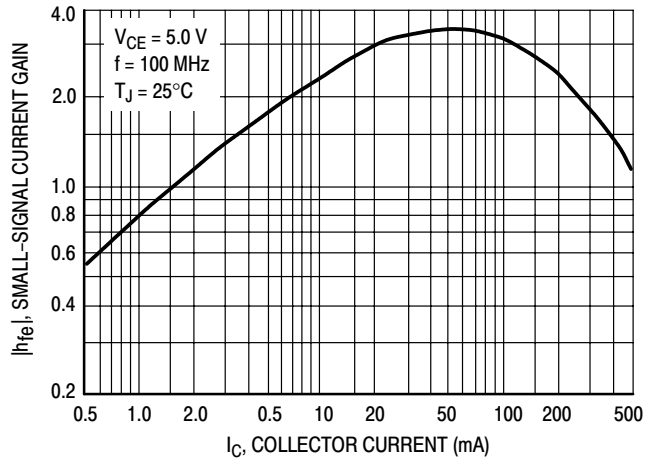


Figure 7. High Frequency Current Gain

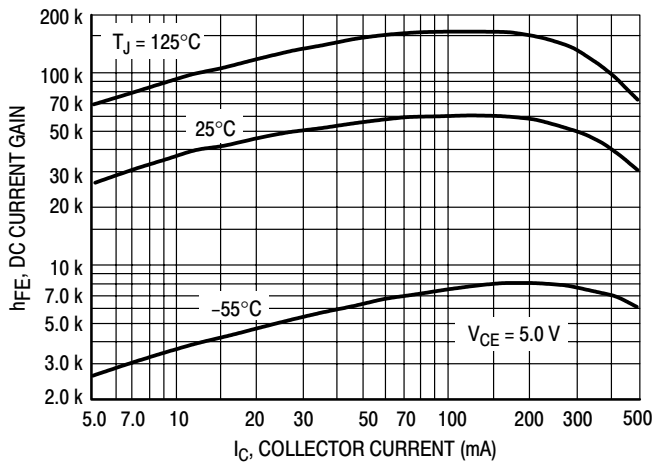


Figure 8. DC Current Gain

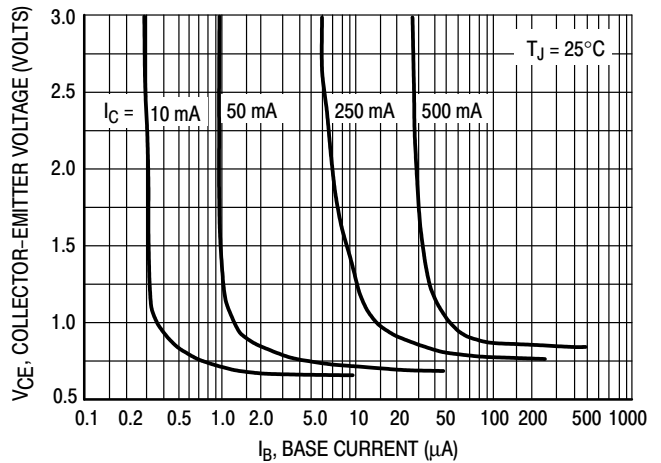


Figure 9. Collector Saturation Region

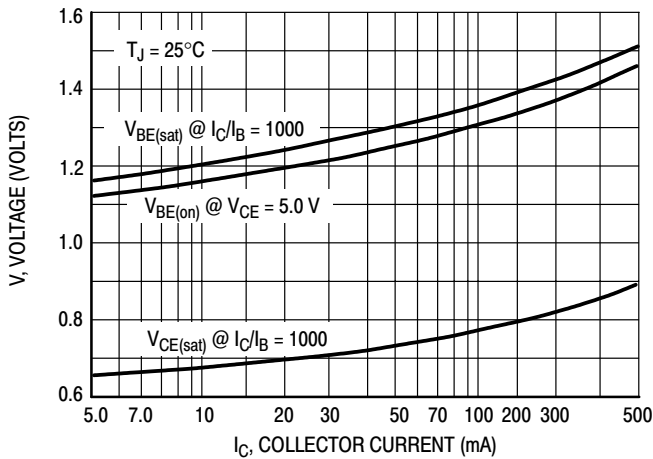


Figure 10. "On" Voltages

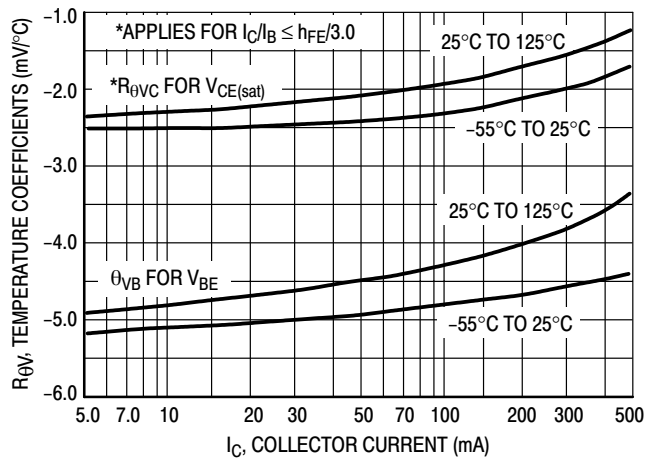


Figure 11. Temperature Coefficients

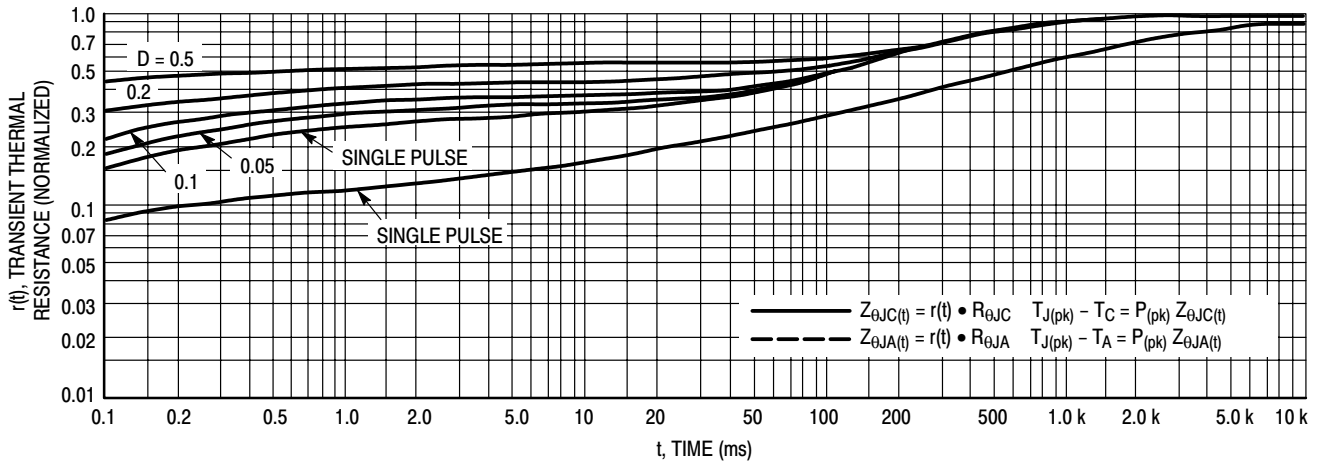


Figure 12. Thermal Response

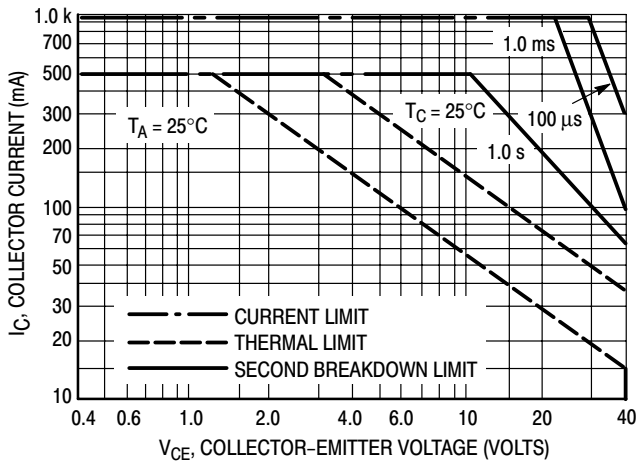
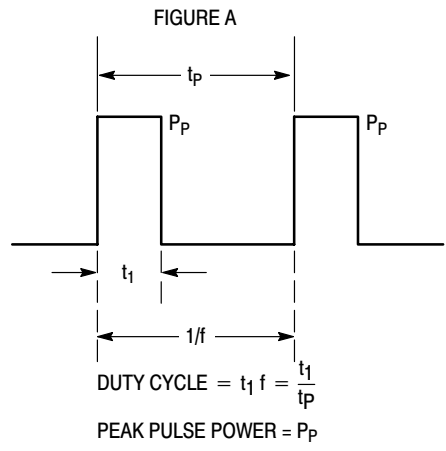


Figure 13. Active Region Safe Operating Area



Design Note: Use of Transient Thermal Resistance Data